The Province of Alberta

IN THE MATTER OF "THE NATURAL GAS UTILITIES ACT"

—and—

IN THE MATTER OF an Enquiry into Scheme to be adopted for Gathering, Processing and Transmission of Natural Gas in Turner Valley

---

G. M. BLACKSTOCK, Esq., K.C., ***Chairman***

Dr. E. H. BOOMER, F.C.I.C., ***Commissioner***

Session:

CALGARY, Alberta March 12th, 1945.

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E X H I B I T S

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10 A.M.Session.
March 12th, 1945.

THE CHAIRMAN: Well,Gentlemen, I am sorry we are a little later starting than we expected to but perhaps that was inevitable on the first morning. However, we will hope from now on to start at 9.30 on Mondays and Tuesdays, and at 10.00 o'clock on Wednesdays.

For the purposes of the record I would like Counsel to announce themselves, and the names of the persons for whom they are acting.

PRESENT:

C. S. Blanchard, Esq., K.C.,	For the Attorney General.
E. J. Chambers, Esq., K.C., -and- J. Ragnar Johnson, Esq., K.C.,	For the Royalite Oil Company Limited and the Madison Natural Gas Co. Ltd.
L. H.Fenerty,Esq., K.C.,	For the City of Calgary.
G. H.Steer, Esq., K.C.,	For the Canadian Western Natural Gas, Light, Heat & Power Co.Ltd.
E. L. Harvie, Esq., K.C., -and- E. D. Arnold, Esq.,	For the British American Utility Co.Ltd. and The British American Oils Limited.
W. H. McLaws, Esq., K.C.,	For the California Standard Company.
D. P. McDonald, Esq.,	For The Producers' Committee.
J. C. Mahaffy, Esq., K.C.,	For Gas & Oil Refineries Limited and associated companies.
A. Hannah, Esq., K.C.,	For Imperial Oil Company Ltd. (Manufacturing Division).

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THE CHAIRMAN: There are one or two minor matters I want to discuss for the moment. At the meeting on the 15th of January I suggested that if you wished we could have a break at eleven o'clock for such purposes as you had in mind and if you desire that, that can be arranged. Do you wish a ten minute adjournment at eleven o'clock?

MR.HARVIE: I would think so, Mr. Chairman, when we are sitting from 9.30 on.

THE CHAIRMAN: In that connection it is desirable that there be no smoking in the Court Room during that adjournment or at the adjournment at one o'clock. The Sheriff objects to cigarette butts being put on the floor and stepped on and sometimes allowed to burn, making nasty marks on the linoleum. Please keep that in mind.

I notice by the calendar that Easter Monday is three weeks from now. Do you desire to sit on Easter Monday or will we sit that week on Tuesday, Wednesday and Thursday? I think the Court House will be closed that day and the orderlies will be gone, and perhaps you may have engagements of your own for that Monday. The Board is prepared to sit on Monday but will not force anyone to do so unless you wish. Easter Monday, what are your wishes?

MR.HARVIE: I would prefer Tuesday, Wednesday and Thursday, Mr. Chairman.

THE CHAIRMAN: Anyone else?

MR.BLANCHARD: Mr.Chairman, I have had to arrange my cases for the Criminal Sittings which starts on the 26th of this month, so that they fall on the last three days of the week, Thursday, Friday and Saturday. As a matter of fact, for the 28th, having forgotten that you were going to sit in

the afternoon on Wednesday, I have called witnesses for that afternoon but perhaps my presencehere can be dispense with for an hour or two in any event, but I am just speaking and suggesting that we do not sit on Thursday of the week that Easter Monday falls in. However, it may be that that can be arranged.

THE CHAIRMAN: You will have to be in the Criminal Court on Thursday?

MR.BLANCHARD: Yes, my Lord.

MR. STEER: You have not figured on dispensing with the sittings for that week?

THE CHAIRMAN: We cannot afford to, Mr.Steer, I do not think any of us can, with the array of expert witnesses which I see around. On the other hand we could make it Tuesday and Wednesday only of that week.

MR.BLANCHARD: Perhaps that could be left so far as the present is concerned.

THE CHAIRMAN: All right.

There is one other point, there are a number of witnesses here who have come from the United States. They are busy men who have many appointments and perhaps they are here today at much inconvenience to themselves, and to their clients. It is desirable that these men be not kept here any longer than is necessary and I hope the cross-examination can be as speedy as possible, compatible with the duty which you owe to your client, and that expert witnesses be not cross-examined by all counsel on the same point unless it be on the same point in connection with a new idea relating to that point. I cannot tie you down, of course. You will do as you please in the interests of your client, but for the purposes of expediency and to accommodate these witnesses,

and perhaps my natural characteristics make me add, to avoid any unnecessary expenses, you will keep in mind what I have said.

Before we start with the evidence, does anyone wish any information of any kind or does anyone wish to make any application? If not, I think it is agreed that Mr. Blanchard should lead by putting Dr. Katz in the witness box.

MR. FENERTY: Before you proceed, there was one point giving me some concern. In the very full and comprehensive reports which have been prepared by various expert witnesses, there are references to various matters which perhaps follow naturally from deductions on the reserves, the immediate subject of our consideration. Now if those witnesses are going to leave Calgary after the matter of these reserves has been dealt with, there may be some questions which we would like to ask them on some points in their reports which have to do with conclusions rather than findings flowing from the evidence in the report. I do not know how we may deal with that.

MR. STEER: I would like to say something on that question also. I have Mr.Davies here as an expert. His evidence is going to be given on a number of different points which are involved in the hearing. His evidence, so far as the reserves are concerned, can be given immediately, but so far as the other points which he has to cover go, that evidence cannot be given until the facts are ascertained and I am going to suggest to the commission that Mr.Davies be permitted to give his evidence on the reserves and then later on in the hearing when the facts have been ascertained, he

come back and give his evidence on the other points.

MR. CHAMBERS: I have a witness, not on the reserves but on the matter of valuations, whose evidence may relate to different phases of the matter from time to time and I am much in the same position, I may want to call him at one stage of the proceedings and call him later at another stage of the proceedings on some other subject, and the same applies to one or two witnesses whom I have who live here, and who will be speaking on various phases of the situation.

THE CHAIRMAN: Well we realize we cannot confine the inquiry to water-tight compartments; in other words, when we are finished with the reserves, that is the evidence available, if at a later date someone wishes to ask something he will, of course, be allowed to do so and we will be glad to do anything we can to accommodate Counsel and those witnesses that have been spoken of. We certainly will not shut out evidence because it was not put in during the first week. We will not do that.

MR.HARVIE: It might be helpful when a witness leaves the box on one subject and is apt to be recalled, or may or may not be recalled, that could possibly be handled by having an understanding at that time as to whether he will be coming back and if so he will be adjourned, his evidence will be adjourned, and if not we will have to go ahead and examine him on all phases that we wish.

THE CHAIRMAN: That would be a little unfair to both Counsel and the witness, to do that, Mr. Harvie, would it not?

MR. HARVIE: Very, but I think we should know

when he is giving his evidence, and is open to cross-examination whether he was coming back.

THE CHAIRMAN: I would imagine they would all come back if they had to, according to what other engagements they had. As I say we cannot keep the Inquiry in water-tight compartments and we will have to deal with each matter as it comes up. We will try to keep in mind at all times the convenience of counsel and of witnesses.

All right, Mr. Blanchard.

MR.BLANCHARD: Mr.Chairman, before calling Dr. Katz I think I should put in for the record as exhibits the several Orders which have been made by the Board up to this point in the proceedings.

The first one is Order No. 1, dated June 19th, 1944, relating to certain installations of the British American Oil Company.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 16.

MR. BLANCHARD: Order No. 2 is an order of the 23rd day of June, 1944, relating to the Madison Natural Gas Company Limited.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 17.

THE CHAIRMAN: Could not all these documents go in as one exhibit?

MR.BLANCHARD: Yes, I think so, as one exhibit.

MR. CHAMBERS: For the purposes of reference though would it not be more simple to have a separate number for each.

THE CHAIRMAN: All right.

MR.BLANCHARD: Order No. 3 is an Order of the 15th of July, 1944, which relates to the Madison Natural

Gas Company Limited and the Gas & Oil Products.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 18.

MR.BLANCHARD: Order No. 4 is dated the 10th day of August 1944, and relates to the Madison Natural Gas Company.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 19.

MR.BLANCHARD: Order No. 5, dated August 10th, 1944, relating to the British American Oil Company Limited.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 20.

MR. BLANCHARD: Order No. 6 made on the 19th of August, 1944, relating to the Madison Natural Gas Company Limited.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 21.

MR. BLANCHARD: Order No. 7 dated the 16th of September, 1944, relating to the Madison Natural Gas Company Limited.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 22.

MR.BLANCHARD: Order No. 8 dated the 5th day of December, 1944, relating to the Royalite Oil Company Limited and Madison Natural Gas Company Limited.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 23.

MR. BLANCHARD: Order No. 9 dated the 5th day of January, 1945, is a general order of the Board.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 24.

MR. BLANCHARD: Order No. 10 dated the 8th of January, 1945, relates to the Madison Natural Gas Company Limited, approving an issue of stocks.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 25.

MR.BLANCHARD: Order No. 11 dated the 12th day of January, 1945, relating to the Medison Natural Gas Company Limited and Gas & Oil Products Limited.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 26.

MR.BLANCHARD: And the last one is Order No. 12 dated the 12th of February 1945, and relates to Okalta No. 1 well.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 27.

MR.BLANCHARD: Then, Sir, I think at this point I will file a report, a summary of production dated 1942, it is a historical summary compiled by the Petroleum and Natural Gas Conservation Board.

DOCUMENT PRODUCED HERE MARKED AS EXHIBIT 28.

MR. BLANCHARD: Then, Sir, that is down to the end of 1942. The reports of the Petroleum and Natural Gas Conservation Board for 1943 are not available this morning. They are in the hands of persons preparing them at the present moment but will be available and I would like a number left for the introduction of that report for 1943.

DOCUMENT TO BE PRODUCED TO BE MARKED AS EXHIBIT 29.

MR.BLANCHARD: I have the reports for 1944 from month/month and that is the only available form that the reports are in.

to

CONSERVATION BOARD REPORTS FOR 1944 PRODUCED AND MARKED EXHIBIT 30.

MR.BLANCHARD: And the next exhibit, Sir, will

be the report of Thomas R. Weymouth, dated October 9th, 1943.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 31.

MR.BLANCHARD: Then there is the report of Dr. George Grainer-Brown, dated March 11th, 1942, relating to the program of conservation for Turner Valley.

DOCUMENT PRODUCED HERE MARKED EXHIBIT 32.

MR.BLANCHARD: I understand, sir, that it is the Board's request that three copies of each exhibit be furnished. Am I correct in that?

THE CHAIRMAN: That was the understanding.

MR.BLANCHARD: I had not known that.

THE CHAIRMAN: Of course we have our copies. What we want is one copy for the Court Reporter.

MR.BLANCHARD: Then that fills the bill, except there will be two copies furnished of the reports. Then I will call Dr. Katz.

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MR. CHAMBERS: Just following on the exhibits that have been filed, I spoke to Mr. Blanchard about this document some time ago. Dr. Katz refers to it in his report that he has presented this morning and that is Dr. Brown's report of 1939. I think it might be interesting to the industry and to those of us engaged in these hearings if that could be made available for them as an exhibit also.

MR. BLANCHARD: I have that report, Sir, but the report was never mimeographed or published. There are only, I think - I have one copy and I think there is one other available, so far as I know. I am quite willing to file it for the information of the Board and for the use of counsel but I cannot furnish copies, unfortunately. It just may be a little confusing if taken generally. The report is a report of "The Active Crude Reserves in Turner Valley Computed from Production and Pressure Data" and made in 1939. There has been a very great change since then.

THE CHAIRMAN: Relating to oil?

MR. BLANCHARD: Crude Oil Reserves.

MR. HARVIE: There is reference to that report in Dr. Katz ' last report and we will have to refer back to that in order to deal with it.

MR. BLANCHARD: Dr. Katz can explain that. However I am just pondering, Sir, whether it should be filed at this stage because perhaps I could make it available more readily to my learned friends, this one copy I have, if it is not filed at the present time.

MR. CHAMBERS: I am not particular about having an extra copy but I am anxious to see that it be marked

as an Exhibit along with all these other documents so that if we want to refer to it we can do so without having to prove it ourselves.

THE CHAIRMAN: There can be no objection to that.

DR. BOOMER: Dr. Katz' only reference to that report is as to the method, is it not?

MR. CHAMBERS: Yes, that it is referred to and he has incorporated part of it in his report and therefore it should be on the records.

MR. HARVIE: It is referred to in his report. What is the official name of that report?

MR. BLANCHARD: It is "Active Crude Reserves in Turner Valley Field, Computed from Production and Pressure Data". It is dated January 3, 1940, The Investigation having been made in 1939.

REPORT "ACTIVE CRUDE RESERVES IN TURNER VALLEY FIELD, COMPUTED FROM PRODUCTION AND PRESSURE DATA" MARKED EXHIBIT 33.

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DONALD L. KATZ, having been duly sworn, examined by Mr. Blanchard, testified as follows:-

Q Dr. Katz, I believe you live in Ann Arbor, Michigan.

A That is right.

Q You are a Professor of Chemistry in the University of Michigan?

A I am Professor of Chemical Engineering.

Q I suppose it is necessary to discuss shortly your qualifications to give evidence in connection with estimating gas reserves, natural gas reserves, an estimate which you have prepared. Would you please tell us where you got your education in Chemical Engineering.

A Yes, I got my Bachelor degree in Chemical Engineering at the University of Michigan in 1931 and received my Doctor's degree also at the University of Michigan in 1943, and . . .

Q What other work did you do after that?

A I worked with Dr. Grainger Brown.

Q That is the Dr. Brown who prepared the Brown report in 1939?

A Yes.

Q And can you tell us also what other work you did?

A In June, 1933 I was employed by the Phillips Petroleum Company at Bartleville, Oklahoma and for three years while I was there I carried on research in Oklahoma, Louisiana, Texas, Mexico and various other states.

Q And you are one of the first to employ the method known as the Material Balance Method of Computing Oil and Gas Reserves?

A Yes and in September 1938, I came back to the University of Michigan where I was appointed Assistant Professor in

Chemical Engineering and in 1944 I was elevated to a full Professorship in Chemical Engineering at the University of Michigan. I was also connected with other companies in making estimates of various fields and was also engaged with Dr. Grainger Brown in his work in the Turner Valley field in 1939.

Q Now you are also the author of some 45 technical works, two of which are dealing with the estimate of gas reserves?

A Yes.

Q Now I believe in 1944 you made a survey of the gas reserves in the Turner Valley field and have made a report as a result of that study?

A Yes.

MR. BLANCHARD: I will turn in also the report of of Dr. Katz,

REPORT MADE BY DR. KATZ, DATED JULY 1, 1944 IS NOW MARKED EXHIBIT 34.

Q I was wondering, Dr. Katz, you made a supplementary report on the 9th day of this month?

A Yes sir.

Q I was wondering whether you would prefer to deal with your supplementary report in its relation to the July report, as you go along, or whether you would prefer to discuss the July report and then go on to your supplementary report.

A I think I should prefer to discuss the report made in July first.

Q Very well.

A "Natural Gas Reserves in Turner Valley", this is to be found on page 3 of my report.

The Natural Gas Reserves are of

two types; the gas produced from the gas cap or former naphta area and the gas accompanying the production of crude oil. In the absence of information on the volume of the reservoir rock containing the oil and gas and lacking the average porosity of the limestone, it is necessary to use oil and gas production data and reservoir pressure declines to predict the reserves of natural gas available for the future market. Material Balance calculations have been made on the entire gas cap, two portions of the gas cap, and three oil areas. Material Balance Calculations on Gas Cap Areas.

The gas reserve may be computed by assuming that the reservoir volume of the gas cap is constant. That is the volume of the gas space remained constant since the initial date. As the pressure decreases on the reservoir, the gas evolved from a given space can be computed from the gas law including the compressibility factor or deviation of the gas from the ideal law. The gas production and pressure drop from date of discovery down to any given date may thus be used to compute the volume of pore space in the reservoir and the initial quantity of gas present in the gas cap.

It might be well to enlarge on that a bit, if you would care to have me do so.

Q Yes. In the method used by you, that is what you call the Material Balance method, you are not concerned with the area of the field, the Turner Valley field?

A No, Sir.

Q Or the thickness of the porous zone, the producing zone?.

A No, Sir.

Q I suppose that would not be true if the Valley had not been fairly completely drilled out. I mean if there were large areas in which no drilling had been done, would that make some difference in your method?

A It possibly would have come into the average pressure as we are going to see. The computation of the gas in place may be made at any two different times and the times which I have chosen are the initial time, that is the time of the discovery of the reservoir and at some final date. But as I have intimated here it should be the initial and then final. It can be, of course, any two dates.

It is known that the gas cap has enlarged and that migration of gas from the crude oil areas down structure into the gas area has taken place. The relatively low permeability of the limestone has isolated the gas cap to a considerable degree over what would have taken place in permeable sand. Migration of gas from the oil area appears to depend to a large measure upon the oil area developing a given saturation of gas phase which results in the high gas oil ratio oil wells. The migration of gas will continue in the future and the portion of the gas initially with the crude oil will appear as gas cap reserve.

The Material Balance method assumes that reservoir pressures may be represented by the average of the well pressures. Under conditions of rapid withdrawal, a pressure gradient develops between the rock away from the well and the well bore. Use of pressure measurements which are lower than actual reservoir pressures give gas reserves which are lower than true values. Since curtailment of production in recent years

has brought the well pressures at the end of 24 hours shut in period closer to reservoir pressure than was possible a few years ago, the gas reserve calculations would be expected to rise for pressure drops and gas production figures at successive years up to the present time.

The Total Gas Cap is treated as a unit in Table I by the method used in a report by G. G. Brown and D. L. Katz to The Petroleum and Natural Gas Conservation Board in December, 1939. The initial reservoir pressure and temperature were presented in that report as a function of depth, 2250 pounds per square inch and 96° F at 950 feet subsea. The compressibility factors for the gas, Z, were also presented for various pressures and temperatures.

To clarify the reserve calculation the items in the Table I will be described -

Item 1, total gas production from gas cap wells was taken from Conservation Board records. Of course we have this Item I for the years 1934 through 1943.

Item 2, average (arithmetic) casing head pressures of gas cap wells from the annual survey in June were plotted against time to give values at the indicated dates.

I would like to say that these are the arithmetic averages of the casing head pressures for the years 1934 through 1941.

Item 3, dP or increase in pressure from casing head to the bottom of the well was computed from the relationship that

$$dP = \frac{\text{density at average depth x depth}}{144}$$

Using a gas gravity of 0.692, the depth of the well as 5050 feet (-950), the average well temperature of 70°F, P, as casing head pressure, and Z as compressibility factor at 70°F and a pressure of $(P_1 + \frac{dP}{2})$, dP becomes

$$dP = \frac{.1236}{Z}\left(P_1 + \frac{dP}{2}\right) = \left(\frac{.1236}{Z}\right)\left(\frac{}{1 - \frac{.0618}{Z}}\right) P_1$$

Item 4 is this average reservoir pressure which is obtained by using the casing head pressure and adding the pressure gradient of the gas well.

Item 5 is the compressibility factor for the 0.692 gravity gas at 96°F and the pressure in the reservoir. It is really the volume which the gas would occupy divided by the volume which it would occupy if you assumed an ideal gas law.

Item 6 is the standard cubic feet per cu. ft, of space and is obtained by correcting one cu. ft. for temperature pressure, and deviation from ideal gas laws from reservoir conditions to 14.4 pounds per square inch in absorption and 60°F.

$$\text{Std. cu. ft.} = \frac{(460 + 60)}{460 + 96)} \frac{(\text{Abs. Reservoir Press.})}{14.4} \frac{1}{Z}$$

$$= .0649 \frac{\text{Abs. Reservoir Press.}}{Z \text{ at Reservoir T \& P}}$$

(Go to page 538)

Dr. D. L. Katz.

Item 7, the difference between the 200 cu. ft. originally present and item 6 at a given date.

Is the difference between 200 cu. ft. originally present in one cubic foot of pore space which was computed for the initial condition and the standard cubic foot contained in one cubic foot of pore space at the indicated date.

Item 8, Item 1 divided by item 7 since the gas produced should have been at the rate per cu. ft. of space indicated in item 7.

Item 9, Item 8 multiplied by 200 cu. ft. initially present in each cu. ft. of reservoir pore space.

Is the original content of a reservoir computed by the data as of the given date.

Item 10, Item 9 minus Item 1.

Gives total cubic feet of gas which remain in the reservoir by subtracting the gas production by the quantity computed as being initially present.

Item 11, Item 10 minus (18 x Item 8). One cu. ft. of pore space at 250 lbs. per square inch contains 18 cu. ft. of gas.

Is the reservoir computed by assuming that the reservoir pressure at 250 lbs. is the abandonment pressure for the reservoir.

Item 12, Item 10 minus (7.6 x Item 8).

Is the reserve computed using 100 lbs. per square inch gauge in the reservoir as the abandonment pressure.

Q MR. BLANCHARD: Dr. Katz, have you any comments to make on which of those two abandonment pressures should be adopted as being the closer to the point at which

recovery of gas can be made from gas cap wells ?

A I have used in the remainder of my report 100 lbs per square inch in the gas cap reservoir as the point of abandonment.

Q You consider they can be produced down to that point ?

A That is right.

Q That is gauge pressure ?

A That is gauge pressure.

The calculations for the earlier years indicate that the reservoir pressures were higher than the well pressures and that the present well pressures are substantially those of the reservoir.

The gas reserve in the gas cap using 100 pounds per square gauge abandonment pressure is computed as 221 billion standard cu.ft. (14.4 and 60°F) as of January 1, 1944. Figure 1 presents the pressure decline with accumulated production and a predicted decline curve for the gas cap based on data at the end of 1943. It should be noted that 52 billion cu.ft. of gas are computed as being present in the gas cap at the 100 pounds pressure but are not included in the reserve due to the low pressure and low ability of wells to produce.

Continuing on Page 10:- The Gas Cap in the British American area was treated as an individual reservoir with calculations similar to Table I. The area under consideration is Township 18 excepting the north row of sections 31, 32 and 33 as indicated on Figure 2, a map of the Turner Valley field. Table II gives the calculations using the same method as described by Items for Table I. The reserve as of January 1, 1944 in the gas cap is computed to be 33 billion standard cubic feet down to a reservoir pressure of 100 pounds per square inch gauge.

Dr. D. L. Katz.

The Gas Cap in the Gas & Oil Products Company and south Royalite area indicated on Figure 2 was treated as another individual reservoir. Table III presents the calculations resulting in a reserve of 45 billion cubic feet for the area down to 100 lbs. per square inch gauge in the reservoir. Based on the 1943 production ratio, this reserve becomes 18.3 billion for Gas and Oil Products and 26.7 billion to Royalite.

MR. CHAMBERS: May I interject - there is a map referred to. Just so that we know which map we have in mind, the figure 2.

MR. BLANCHARD: The map is already part of the Exhibit here, that is the map attached.

MR. HARVIE: Is that the map referred to as Figure 2?

MR. BLANCHARD: That map yes.

WITNESS: I will not read or say anything about Tables 2 and 3. I will skip over Tables 2 and 3 and continue on the material balance calculations on oil and gas areas.

Q DR. BOOMER: May I interrupt in your Item 3. You spoke of the Item 3 plus Item 2, to give the reservoir pressure ?

A Yes sir.

Q You are assuming the gas cap at the bottom hole pressure is the reservoir pressure ?

A That is right. In this report I have used the arithmetical average of the bottom hole pressure of the gas wells and used that as the average reservoir pressure.

MR. CHAMBERS: That is Exhibit 34?

MR. BLANCHARD: That is right. That is Exhibit 33.

A (Reads) Material balance calculations may be made to estimate the oil and gas reserves in the oil producing areas. In addition to data on oil production,

gas production, and bottom hole pressures, gas solubility and shrinkage data for the crude oil must be known. The method used was published in the Trans. A.I.M.E., p. 19, 1936 and p. 28, 1942, with a detailed description of the method for Turner Valley in the report to The Petroleum and Natural Gas Conservation Board in December 1939.

Tables IV, V and VI present the calculations for the British American area, the Gas & Oil Products area, and north Turner Valley (see Figure 2) using the same item numbers as the Brown and Katz report. The above references should be consulted to obtain the details not evident from the tables.

I might say the method is very similar to the material balance method for gas reserves in a gas cap excepting that we must consider the reservoir has two phases, the crude oil, liquid and a gas phase as the pressure is reduced on the oil area the crude oil gives up gas with a pressure drop in accordance with our solubility curves and the crude oil shrinks in volume the liquid volume becomes less in accord with the shrinkage curves presented. These two facts must be taken into account in the calculation of material balance, the quantity of liquid phase and the quantity of gas phase present in the reservoir must be computed as of a given date from the average pressure in the reservoir and the withdrawals of oil and gas and the solubility and shrinkage data. The results of these calculations are summarized here.

The results are summarized as follows giving acres

the initial crude oil in millions of barrels and these of course refer to oil measured at 60 degrees atmospheric pressure in stock tanks.

	Acres.	Initial crude Oil.Million bbls.	Initial Gas Reserve to 250 lbs.Bill.Std. cu.ft.	Reserve to 250 lbs.1-1-44 Bill.Std. cu.ft.
B-A Area	2440	191	120	40.2
South Royalite & G. & O.P.	3480	162	99	36.4
North Turner Valley	2920	197	125	76.9
	8840	550	344	
Area South of Sheep River	1080	67	42	26.
	9920	617	386	179.5

The area south of Sheep River not included in the B-A or G. & O.P. area was given a reserve based on average per acre reserve of the remainder of the field.

The short coming of the material balance calculation for the oil area is the use of 24-hour shut-in bottom hole pressure for the reservoir pressure. Since the difference between the true reservoir pressure and the 24- hour pressures is the greatest in north Turner Valley, a calculation was included in Table VI assuming that the true reservoir pressure was 2000 pounds rather than the 1569 pounds which is the average of the 24-hour shut-in pressures. It may be seen that some extra 161 billion cubic feet of gas down to 250 pounds pressure would have to be present for this higher pressure. Water encroachment into the reservoir to the extent

it has taken place will offset the effect of the low 24-hour pressures.

MR. BLANCHARD: That is your calculations are extremely conservative in that respect ?

A Yes.

It should be noted that gas reserves are taken to 250 lbs. in the reservoir - true pressure. If a lag exists between the true reservoir pressure and the 24-hour pressure, this lag will persist at the lower pressure. Thus if the calculated reserves are low for the future gas production because of the higher present reservoir pressure over the 24-hour pressure, the calculated reserve may be more nearly equivalent to the reserve down to 250 pound 24-hour pressure than to the true gas content of the reservoir.

The figures given in the above summary should be considered to be low but sufficient information is not available to place a higher reserve at the present time.

Now I have the tables giving the details of these material balances and this concludes the gas reserve portion of the report of July 1st, 1944, and I would like to proceed then with supplementary studies that have been made as of last week.

Dr. D. L. Katz.

INTRODUCTION

Additional data on gas production, oil production, and well pressures have become available since the report of July 1, 1944, was made. Reserve calculations have been made using the later data in the general manner set forth in the report of July 1. Minor modifications in the calculations will be brought out as they occur.

GAS CAP AREAS

The gas cap is treated in three segments with the sum of the segments giving the complete gas cap. The B. A. (British American) Area, the G.O.P. (Gas and Oil Products Co.) and South Royalite Area, and the North Royalite Area will be discussed in turn.

The average pressure in the report of July 1, was the arithmetic average of the bottom hole pressure of the wells in an Area. Both the arithmetic average and an average based on acres assigned to the well by the Conservation Board were computed for the three Areas. The latter procedure of multiplying the reservoir pressure by acres would be an areal average, if all the acreage were drilled. It should be noted that there is considerable undrilled and unassigned acreage within the confines of the generally accepted gas cap area, which has not been used in weighting the pressures.

A comparison of the results from two procedures for calculating the average reservoir pressures, as of June 30, 1944, is as follows:

	Arithmetic Average	Assigned acreage Weighted Average
	lbs/sq.in.ga.	lbs/sq.in.ga.
B.A. Gas Cap	566.2	569.2
G.O.P. & South Roy.	501-4	497.1
North Royalite	566.2	583.2

The weighted average pressure on assigned acreage was used in this respect.

The B.A. Gas Cap, as indicated on Figure two of the July 1 report is the gas cap south of the north line of Section 28 (TP. 18) and includes some 17 producing and 8 abandoned wells. A calculation similar to Table II of the July 1 report gave 28.6 billion cu.ft. reserve as of 1-1-45 down to 100 lbs. per sq.in. in ga. in the reservoir. An accumulative gas production of 152.2 billion cu.ft., as at June 30, 1944, was used. The original conditions in the reservoir were re-evaluated as 106° F., 2320 lbs. per sq.in. ga. at an average depth of - 1650 feet.

The G.O.P. and South Royalite Gas Cap extends north from the B.A. Area into the northern half of section 17 (TP.19), and includes 23 producing and 4 abandoned wells. A calculation similar to Table III of the July 1 report gave 44.1 billion cu.ft. of gas reserve as of 1-1-45 down to 100 lbs. per sq. in. ga. in the reservoir. An accumulative gas production of of 257.2 billion cu. ft. was used. This reserve was allocated to the G.O.P. plant on the basis of the Brown allowables as 40.8% of the total or 17.9 billion cu. ft.

Dr. D. L. Katz.

The North Royalite Gas Cap consists of 59 producing and 8 abandoned wells, comprising the remainder of the gas cap not in the above two areas. This area was not treated separately in the July 1 report, but has been included in this study for comparative purposes. The reserves down to 100 lbs. per sq. in. in ga. in the reservoir as of 1-1-45 were computed to be 142.5 billion standard cu. ft. of gas.

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Q MR.BLANCHARD: Doctor, in estimating the total of Madison crude gas, gas from crude wells, you would then add to that 142.5 billion, 26.2 billion that is in the South Royalite area?

A Yes, the gas cap area.

Q That gives you the figure of, in the introductory part, of 168.7?

A I believe that is right.

Q Yes, 168.7. Just to reconcile it with the summary on Page 1 of your supplementary report.

A Yes. Royalite gas cap is not the North Royalite gas cap. The total Royalite gas cap was considered including all of the wells, as part of the North Royalite gas cap, plus a portion of the area I have called G.O.P., the South Royalite area.

Q In that portion of the Southern area which is tributory to Madison, you estimate the reserves for that as 26.2?

A 26.2 billion.

Q Out of the 44.1 billion for South Royalite and G.O.P.?

A That is right.

Q So that makes up your figure of 168.7 on page 1?

A Yes.

Q That is all.

A " An accumulative gasproduction of 654.1 billion cubic feet, an initial reservoir pressure of 2,290 pounds per square inch gauge and a reservoir temperature of 100° Fahrenheit, (-1250 feet) were used in the calculation.

All gas cap reserves were computed using accumulative gas production data and an initial

"reservoir pressure of 2360 pounds per square inch at -2200 feet, a gas phase gradient of 7.34 pounds per 100 feet, and an oil phase gradient of 33.1 pounds per 100 feet."

In other words, this statement gives the average initial reservoir pressure corresponding to a given depth for any area.

" The total gas cap is computed in this case as the sum of the three areas as 215.2 billion cubic feet as of January 1st, 1945, down to 100 pounds square inch gauge in the reservoir.

THE OIL AREA GAS RESERVE

The oil producing portion of Turner Valley was treated in four areas in the report of July 1, 1944:-

B.A. Oil area, G.O.P. and South Royalite area, North Turner Valley (north of Sheep River) and an area south of Sheep River. Material balance calculations were reported on the first three of these areas to give the initial crude oil in place and the gas reserve. These calculations have been repeated, using data as of January 1, 1945, with results as follows:- "

These were taken from the Conservation Board's records. I will not read the accumulative oil production, the accumulative gas production, the average 24 hours bottom hole pressure, initial crude oil present, the initial gas present. I will read the gas reserve down to 250 pounds square inch gauge in reservoir, as of the 1st of January of this year. B.A. area 37.1 billion; G.O.P. and South Royalite 38.8 billion;

North Turner Valley 91 billion; the area South of Sheep River 24 billion. Total gas reserve oil area, 191 billion Cubic feet.

" In making these calculations it was found that two charts for shrinkage of Turner Valley crude oil are available, and somewhat different. A word of explanation is in order since the writer prepared both charts some years back. The report of Brown & Katz, in 1939, to the Conservation Board, contained a Chart based on crudes similar to Turner Valley crude, as explained in the report. In 1942 when the Brown plan was in the making a shrinkage chart was required. At that time some data secured by Mr. Boomer on Turner Valley crude was furnished the writer, and a new relationship for predicting shrinkage from solubility was also available. With the information at hand a new shrinkage chart was drawn and was reproduced for the Conservation Board as Figure 2, 1942. No change was made in the solubility curves.

The July 1, 1944, report used the original shrinkage chart in the 1939 report, while the results reported above are based on the Conservation Board (1942) Chart. It was found that the differences in the charts caused a difference in the calculated gas reserve for the B.A. area of less than 1 billion cubic feet.

The area south of Sheep River not in the two areas studied, is generally the less productive part of the field. As an assignment of initial oil content and future gas reserve on an average basis is on the high side

"for the area, but partially offsets the effect in the total reserve of the difference between equilibrium reservoir pressures and the 24 hour bottom hole pressures used.

A revised table similar to that on Page 13 of the July 1 report, gives the area South of Sheep River and north of the G.O.P. and South Royalite area, 72 million barrels initial Crude Oil and 24 billion cubic feet gas reserves as of 1-1-45."

And I have an acknowledgment to Natural Gas Conservation Board for their records.

Q To go back to the summary on page 1 of the supplementary report, which I now tender as an exhibit.

THE CHAIRMAN: That will be Exhibit 35.

DOCUMENT IN QUESTION NOW MARKED EXHIBIT 35.

MR. BLANCHARD: The summary of this report presents the gas cap crude oil reserve on a basis of July 1st, 1944 report, as corrected for production for 1944 to bring it up to date to the 1st of January, 1945. The first calculation is in the same manner using the same date as you used in the July report?

A It is the July report computations less the production during 1944.

Q Then when you come to the supplementary report, you have, as you have explained, used certain different factors.

A Different factors and different data a year later but actually computed on the same general methods. You will see if you like to compare them. The gas cap of the B.A. area is 31.7 in the July 1st report and 28.6 in the supple-

mentary. The G.O.P. area is 17.2 and 17.9. The Madison or remainder of the field since July 1st report, which simply calls it the remainder of the field, is 161.1 against 168.7 for the gas cap. And the totals are 210.0 and 215.2. That shows very little change in the reserves. In the crude oil areas the B.A. went from 27.2 billion cubic feet to 37.1 billion cubic feet. I might state that that was as a result of a large volume of gas production there without a very large drop in bottom hole pressure, and I re-checked the calculations to be certain and I think they are correct. The G.O.P. area went from 10.2 billion to 13.8 billion; and the Madison or remainder of the field, went from 112 billion to 140.1 billion. The total wet gas reserve was 359.4 billion on the July 1st report, brought up to date, and 406 billion for the supplementary report. The total residue gas reserve, which I have computed on the basis of 85% of the wet gas of the gas cap as being residue and 70% wet gas from the crude oil area as residue, gives a total residue gas reserve of 284 billion on July 1st report and 317 on the report as of the 1st of this year.

Q MR.BLANCHARD: What factors are taken into consideration in the 15% that you have deducted from the gas cap natural gas to get your dry or residue gas?

A There was the shrinkages which take place as the oil is scrubbed, removing the natural gasoline and butanes and the shrinkage which also took place in purifying the gas of hydrogen suplhide and carbon dioxide, and then there is the engine fuel which is required in handling.

Q Is that also taken into consideration too?

A Yes.

Q Then you took 70% of the crude oil?

A Yes.

Q Now what factors are taken into consideration there?

A In the 70% of the total wet gas reserves, being residue, it includes the extraction lost in a natural gasoline plant, it includes scrubbing loss in purifying the gas, it includes the fuel for compression both flowing into the pipe line and the gathering end, and it also includes an estimated quantity of ungathered gas. That is, a portion of the wells will not be producing, will not be producing into the system, gathering system, and those wells were lumped in with the other losses together, and a total of 30% of the wet gas is lost.

Q Have you broken down the figure of 30%, I mean now what percentage is used of unrecoverable gas as a lump sum?

A I don't know as I have because I was thinking of it in terms of areas. In one area you will have a different fuel consumption than in another. Probably it is somewhere about five or eight per cent of the total wet gas will be ungathered.

Q Then you would have that as unrecoverable gas?

A Yes.

Q So that when you say there is so much residue gas you are putting it forward as recoverable residue?

A Yes.

Q In breaking that down, the residue gas in the various areas, the areas of the field, that is broken down somewhere in the report, perhaps you can take the figures I have, Doctor, take the H.A. area, I think you have a total for the gas

cap here of 28.6 and taking 85% of that, that would leave you 24.3 billion cubic feet residue gas in the B.A. gas cap?

A Yes. For the supplemental report, is that right?

Q Well I would not ask you.....

A 24.3 billion, yes.

Q Haven't you got those?

A I haven't computed those.

Q We can submit that perhaps as a computation afterwards.

A Icomputed it in pencil, I am sorry. I put it on my summary sheets. If you would like me to read it I have found it now.

Q The summary to the supplemental report?

A Yes, I have computed it in pencil on my own copy.

Q Well you do not need to read that memo at the present time. Now in your July 1st report, Doctor, there are some tables, tables 7, 8, 9, I think, and perhaps 10, which relate to the projected operations of British American Oil, the gasoline re-pressuring plant, and the G.O.P., and those, I understand,were prepared at a time when the B.A.plan for the conservation of oil in the South end of the field was before the Board, for its consideration, and I understand that all those figures are based on estimates made by the British American Oil Company which were presented to you at that time.

A The cost estimates of the plant and the operating expenses were based on the report of the British American Oil Company.

Q And also based on your information or your assumption as to throughput?

A Yes.

Q And based on your estimates of reserves?

A Yes.

Q And depended entirely for their validity on the accuracy or correctness of the estimates that were before you?

A That is right.

Q So that the point today is that, Mr.Chairman, those tables have no interest at this time at all. They were simply included in the report to give some approximate figures based on estimates that were furnished by British American Oil Company and Oil Products, Gas & Oil Products. Haveyou made any general calculations, Dr. Katz, as to the additional gas that will become available for market by reason of the conservation undertaken in Turner Valley?

A I have made a consideration of it from maybe two stand-points. One of them is based on theactual percentage of the field production which went to market in the beginning of 1944.

Q Yes. Those are shown on page 23 of your July report, your main report?

A Yes.

Q And you took the first four months' production of the gas sold during those four months to get your factor of how much gas was sold, actually got to market out of the gas produced, and your factor that you used was, I think, 41.8?

A That is right.

Q Now then, in your July report you had a reserve of 401 billion as your total, total reserve, but perhaps we do not need to bother about that. But if you took your reserve

in your supplemental report, 406.2 billion is the reserve you got in your supplemental report, the total reserve of wet gas?

A Yes. If you took that reserve, and while I computed it on the residue gas basis, you could compute the life of the field on the basis of certain marketable gas.

Q Well your 41.8 factor is taken on a wet gas basis is it not?

A Yes, that is right.

Q On a wet gas basis as against dry gas sales?

A That is right.

Q That is correct?

A Yes.

Q So that if you took the total wet reserve of 406.2 billion you would have, without the conservation measures that have taken place, 169.8 billion?

A Yes, that is right.

Q To market?

A Yes.

MR. CHAMBERS: How much is that figure?

MR.BLANCHARD: 169.8 billion to market.

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Q If you take the estimated average market of 12 billion cubic feet a year that would give your field a life of 14.1 years.

A That is right.

Q If you take the gas cap, your supplementary report of your gas cap reserves at 215.2 and you say that 85 per cent is recoverable, economically recoverable. Or rather I should say that the dry gas equivalent will be 85 per cent.

A 85 per cent, yes.

Q That will be 182.9 billion feet from the gas cap to market. That is corredt?

A That is right.

Q And then this crude, you have 191 in your supplementary report and you take a factor of 70 as the available market reserve, dry gas, which would be 133.7 billion cubic feet to market.

A That is right.

Q I am correct in these assumptions, am I?

A Yes.

Q And that would give you a total of 316.6 billion feet available to market on your calculation?

A That is right.

Q And that would give you a life of the field, using 12 billion cubic feet a year, a life of 26.4 years.

A That is right. Maybe I should say a word about that procedure.

Q Yes, I would like you to comment on that. I was going on to one other figure. Your total dry gas to market in that calculation, in your report, amounts

to 316.6 billion feet. That is residue gas. Going back to the figure that we indicated would be the gas reaching the market without conservation measures being put into force which was 169.8 billion we have an additional reserve by reason of conservation of 146.8 billion feet. Now you probably will want to make some observations as to what errors may occur in any calculation of that kind.

A The figure of 41.8 per cent does not take into account the schedules of gas in the area rather from the gas area and I suppose one could take in the gas. But assume that the percentage of gas in the future that is marketed has the same relationship to the total of gas production as it did in 1944. If you assume that that would not be increased with time without conservation it might be analagous to assuming that the gas in the gas cap could not be conserved by itself but that it merely becomes part of the gas cap area from the oil area and that any assumption that you are going to isolate a portion of the gas in the gas cap as if it existed at a fairly high pressure while the oil area itself becomes exhausted or abandoned. This procedure I have used assumes that that probably would not take place, so that I have by this procedure assumed or used a method which gives a lower recovery of gas without conservation than probably would take place. Another way of indicating the quantity of gas which has been conserved is to go to the amount of gas which the British American Oil Company and the G. & O. P. Plant are going to have available, the residue gas they are going to have available and add to that a/quantity which I did not compute. That would be the gas collected in by Madison No. 3 station or Madison No. 1 station in the remainder of the oil area which was

not being gathered before conservation plans took place.

Q The figure of 136.8 billion may be substantially high?

A That is right.

Q In regard to these points?

A That is right.

Q Now I just wondered if you had anything to say with reference to the migration of gas to the gas cap or later on from the gas cap, or have those factors been taken into account in your computations?

A The gas cap area, of course, has a lower pressure than the oil area and if migration is taking place it will be taking place now as in the past from the oil area to the gas cap area. My method of computing the gas cap reserves assumes that the quantity of gas in the reservoir remains constant. But if gas migration has taken place into the gas cap area, it will not have any effect on my reserves materially because I have used the cumulative gas production since the initial date and the addition of a number like 25 billions or something like that would not change the reserve which I would compute materially. If this migration is taking place now it will take place even to a greater extent in the opposite direction if the oil area pressures in the reservoir become lower than the pressure in the gas cap as a result of future production and as a result of repressuring the gas cap. To the extent that that takes place part of the reserves that might have been in the gas cap might actually have been produced through oil wells eventually.

Q Is there anything else now, Doctor, at this moment, that you want to say?

A I think that is all I have, particularly.

DR. BOOMER: I would like to get your opinion of the effect of errors in the basic data on the Material Balance method of computing the quantity of gas in the ground. Suppose the data of production available to you produced figures that were less than the actual production, how would that affect your calculations?

A If the quantity of gas produced was actually greater than the figure which I used?

Q Yes.

A My reserve would be low. Would be low. I could compute it for any given case but it would take a fairly good amount. You could compute it rather closely, I believe, if the total production were 10 per cent low - no, you could not that way. It would increase the total gas in the reservoir by the amount of the total production which actually took place and you would have to subtract from that the actual production and it would give a greater percentage increase in the gas reserves than the error, the percentage of error of gas production.

MR. STEER: That is relating to the gas cap only?

A That is thinking of the gas cap, yes.

Q DR. BOOMER: Then if the gas cap figures as recorded were 10 per cent low the reserves at present in the gas cap would be more than 10 per cent higher than computed.

A That is right.

Q Have you an opinion as to the effect of such errors in the record with respect to the Oil-Gas field?

A Well I assume that the error in the calculation in the initial gas present in the oil area would be primarily an

error in pressure, that the production records are reasonably accurate and I did make a calculation on the North Turner Valley oil area that indicates that if the pressure was off by, I believe it was 431 pounds too low that it would increase the reserve by 90 billion cubic feet. I believe that is a higher pressure than actual but it does give an indication of the error that can take place.

Q What is the absolute error in the Material Balance method, assuming the data is good on which you base it?

A It would be an error essentially in the calculations of . . .

Q No, it would not be an error. Suppose your bottom hole pressures were good and you take the weighted average or the arithmetic average, what effect would that have on your final reserve figure?

A If I have a higher pressure, for example, by the weighted average in the North Turner Valley gas cap, the North Royalite gas cap, when I used 20 pounds higher pressure that gave me a higher reserve. But if I understood your question at the beginning, if the assumptions are correct, that the reservoir pressure is the pressure of the wells, and that the original pressure is correct and if the gas composition is what we say it is and if production figures are correct of course the volume of the reservoir remains constant and no migration in or out, then there really is no error in the method.

Q What I meant was how much weight would you give yourself in your own opinion to your figure of 406 billion feet from the point of view of the weight that you gave the basic assumption you made as to bottom hole pressure.

A I would say my figures are conservative and while I thought that possibly 20 per cent error is high, such might be possible - I mean that I am low by 20 per cent, would be the order of the magniture of the error I would feel to represent the data which I have and the possibilities of differences which actually exist in the values I have used.

MR. BLANCHARD: What your report shows is what gas you believe to be there.

A For certain, that is right.

Q You do not guarantee your figures as to how much will actually be recovered from that because that depends largely on the methods of production as the field is produced and as we go on further?

A Yes. It is based - well, the prospective total gas which is to be produced which I have estimated at 85-70 for example.

Q You think it would depend on the methods of production used later on in this field as to whether it would be higher or lower I suppose?

A Yes, just as I based my opinion on the gas and oil in the supplementary report. It is possible in the case of a probable increase in the oil area that a year hence when one makes the same calculation that it is likely that the result would be an increase in the gas in the oil area.

THE CHAIRMAN: We will adjourn for ten minutes.

(At this stage there is a short adjournment).

Dr. D. L. Katz

THE CHAIRMAN: Have you made any arrangements between yourselves as to who will be cross-examined first.

MR. CHAMBERS: I would like to make my views made known in that regard and the considerations that have occurred to me. One is that in the ordinary course of events it should be decided by seniority of counsel. Frankly the clients I represent have no very great difference of opinion with this witness. There are others represented here that will probably take issue and I do suggest that so far as my client is concerned it would not only be to our advantage and save time but to the advantage of the Commission that those who are probably more adverse in interest should proceed first.

THE CHAIRMAN: As I see it the difference between Dr. Katz's figures without making any allowance for error and those of your client are about 36 million feet. The difference between you, 36 million feet without making any allowance for error.

MR. CHAMBERS: There are certain other considerations that are taken care of in the report, different factors. What I have in mind is this perhaps. Perhaps the City and the Gas Company will take more violent exception than we will.

THE CHAIRMAN: Then you propose doing ?

MR. CHAMBERS: Yes, and I think it would be to the advantage of all parties if those issues were drawn in cross-examination and we could follow it up afterwards.

MR. FENERTY: Well on my friend's theory that

those who are more adversely interested should cross-examine first it could possibly be that we would not cross-examine or be here but because we have an argument to make that the interests of the City are those most vitally affected. Quite frankly my cross-examination of Dr. Katz's statement will be very brief and I think unless something else is brought out by examination for other clients I will occupy only a few minutes. I understand other Counsel had wished to examine at length and it might be brought out by those who wish to examine at length and they should take precedence.

THE CHAIRMAN: It would be unfair to say that you would like to pick the other fellow's brains before you do your cross-examination.

MR. FENERTY: I do not think they will get much benefit from mine but I might get a little from theirs.

MR. STEER: I would like an opportunity to cross-examine Dr. Katz either this afternoon or night.

MR. HARVIE: I think that is very applicable to all of us.

THE CHAIRMAN: The very thing we wanted to avoid.

MR. STEER: Of course this is the first witness and we had a supplementary report which so far as I am concerned I have not given that a study and Dr. Katz has introduced some new points here which I would like to have an opportunity of consulting my experts about before I question Dr. Katz and I think really a great deal of time will be saved if I have a chance to do it and I am not compelled to reveal my ignorance at this moment.

THE CHAIRMAN: What about Mr. McDonald ?

MR. McDONALD: There is one point raised by Dr. Katz that I wish to have instructions on. Something that did not turn up in his report at all.

THE CHAIRMAN: Mr. Harvie ?

MR. HARVIE: Well there are points that we do wish to discuss before we complete our examination and this matter of putting in a half an hour or an hour, there are some points we could well ask now.

MR. FENERTY: There is a suggestion I might make if Counsel want an opportunity of absorbing some of this technical evidence. It is now almost 12 o'clock. I have an application I propose to make to the Commission which might take a little while and perhaps I should have made it at the commencement. It involves the production of some records and the accountant informs me if they are to be produced they should be produced reasonably soon in order to have a certain amount of work done on them. It might possibly occupy the time of the Commission. I do not know - until the adjournment, so that Counsel can have an opportunity if they want to review this evidence.

THE CHAIRMAN: It is quite obvious nobody wants to go on with the cross-examination now. All right, Dr. Katz, we will release you as nobody wants to tackle you. We will leave that until tomorrow morning at 9.30.

MR. CHAMBERS: Could we decide who will follow Dr. Katz ?

THE CHAIRMAN: I understood that Counsel were going to have a meeting this afternoon to try to arrange things amongst themselves.

MR. BLANCHARD: Possibly we could do it this morning and not have to come back this afternoon. It has been

suggested that possibly the Board should be there at the discussion between Counsel.

THE CHAIRMAN: I have another hearing this afternoon.

MR. BLANCHARD: Well I was suggesting we might dispose of that this morning.

MR. STEER: I would suggest that Mr. Fenerty make his application and then that will dispose of it and this may take place and see if we can come to some agreement on the order we will take. I agree with Mr. Blanchard that it would be highly advisable if the Board were present.

THE CHAIRMAN: Who are involved in this application.

MR. FENERTY: The Royalite. We understand that Mr. Hamilton, accountant for the Commission, is available and is submitting Madison Gas statement and report for the year 1943. We feel that in order to make a proper enquiry there should be made available and we suggest that the representative of the Attorney General should ask for and obtain if possible and make available to the other parties engaged in this enquiry, the financial statement of the Royalite Company for the years 1942 and 1943, showing the operations and results of that integrated company in the sense that those statements, the ones we want to have produced, should deal with the operating results of the various departments of the Royalite Company for those years. That would include the apportionment of costs as between oil operations or rather I should say absorption plant operations, natural gasoline operations and gas and a breakdown showing costs and allocation as between the various

departments. Now I suggest to the Commission that the operations of the Royalite Company involving both oil and gas operations which I submit in any event are going to be an integral part of this enquiry and must necessarily be enquired into, the ultimate separation of those operations and the apportionment of the cost between them, but this operation of the Royalite Company were public utility operations under the Utilities Act as it existed in 1942.

THE CHAIRMAN: The Court of Appeal said not, Mr. Fenerty, in Major Oils and Royalite. The Court of Appeal said they were not a public utility. I held they were but they said they were not.

MR. FENERTY: I do not mean they were in the sense they were the actual subject matter, but under the Act the definition and you will appreciate the definition of an oil well as a public utility at the present time includes any well capable of producing gas, and my understanding of the situation of these wells in Turner Valley is that I think practically all of the oil wells known as such, leaving out on the gas cap, the crude oil wells that operate with a gas lift. There is no pumping proposition in Turner Valley at the present time. They are all gas lift operations and there is no oil well in production in the Turner Valley area today which does not come within the present definition of a public utility under the Act as it now exists. I think that much is so. And if necessary confining ourselves solely to the present Act we think that these oil wells by virtue of their capacity to produce gas are within the definition of

a public utility and one of the purposes of this enquiry amongst other things, or one of the things that this enquiry, I suggest must go into is, going to be an apportionment if it is an apportionment at all - if there is to be an apportionment,- some division between the oil industry and the gas industry as to certain expenses. One party may argue it all belongs to one and the other party argues it belongs to the other. There will be an allocation of expenses either the gas or oil industry which must be apportioned and some one has to bear it. There is one of the essential points where we get an apportionment. We get a practical operation and we get the set-up and we do not get any of that from the books of the Madison Company from 1944. Although they were integrated operations of the Royalite, possibly the only Company that had this integrated operation during the years 1942 and 1943 and I submit that the production of those books and the allocation of the cost as between the Natural Gasoline and absorption plant industry and the gas industry is just as essential to such an apportionment as is the statement showing the Madison Company cost in relation to the gas industry for the following year.

We are going to deal with the apportionment between gas and oil and we think the production of the books relating to gas and available for production is required, all books and accounts of the practical allocations between gas and oil, and it follows if we are going to have enquiry into gas costs and apportionment of gas and oil costs, I submit we must have some source from practical operations, one from Madison as to gas rates and second from

Royalite during those two years at least as to the apportionment of the gas and oil.

MR. CHAIRMAN: Have you asked for that information Mr. Fenerty ?

MR. FENERTY: Yes and my friend has taken the position he is not in the position to provide us with the books.

MR. CHAMBERS: My learned friend made the statement that Mr. Hamilton was going to use that information at the hearing. Now I am not so clear that was so and I would like to know, it might affect what attitude I take. My learned friend made that as a statement and I think it should be clarified that the Board's auditor was going to use that information and present it at the hearing.

MR. FENERTY: The only statement I made was that Mr. Hamilton for 1944 was going to present those figures. I cannot say myself just to what extent the allocations have been made by Mr. Hamilton himself in considering the entries in the books. Mr. Hamilton might be able to say.

MR. HAMILTON: If I might add a word of explanation for the year 1943, we have obtained and intend to submit a statement of operating results of Royalite wholly owned gas wells and a similar statement of results of operations of the Royalite wholly owned crude wells. Both of those for the year 1943. Mr. Fenerty last week I believe and also Mr. Steer approached me with respect to this question as to whether we would be submitting as part of our submissions results of the gas position of the Royalite

Oil Company for the year 1943 on a basis which would be comparable with the 1944 Madison results and we gave them our answer that as far as we presently could see we did not intend so to do, but we do intend to present the results of the operations of the wells as such.

MR. CHAMBERS: The reason I asked that question was because I was asked if my clients would be prepared to have the operating costs for 1943 of Royalite Gas division made available to the City and inferentially to everybody else and I was then informed and Mr. Hamilton confirms it now that he does not intend to use it and on that basis I objected and I am opposing this application but I would like to know whether and get it clear on the record just what my friend is asking for. Is it just the operating costs of the gas division of Royalite for 1943 or what.

THE CHAIRMAN: As I understand it, he wants financial statement beginning with the year 1942 right up to date showing the whole operations of the Royalite Company.

MR. CHAMBERS: To that I can say Royalite is a public company and the statements are filed with the Department of the Secretary of State and can be found there without an order of the Board.

THE CHAIRMAN: I know the kind of statements they are which will tell you nothing but a lot of totals. That is not your fault but that is all that is shown.

MR. CHAMBERS: I would like to know what information he is asking the Board to order us to give.

MR. MORRISON: Mr. Fenerty has asked me to say something on that from the City's viewpoint. We asked that the information be made available showing results of gas operations of the Royalite Company for the years 1942 and 1943. If that can be done without showing the material from which it was obtained that may be satisfactory but we feel that the nature of the integrated company, the relative material will also have to be put forward.

MR. CHAMBERS: I take it that is the information wanted and I would ask my learned friend if he would indicate to me under what Section of the Act he is founding this application.

THE CHAIRMAN: Well I think under Section 19, if the Royalite is a public utility and I think it is under the Act, they can be compelled to furnish information and produce their books.

MR. FENERTY: I do not think we can improve on that section.

MR. CHAMBERS: That is the section you are applying under I take it.

THE CHAIRMAN: What you say Mr. Morrison is that you want the result without necessarily getting the details from which that result is obtained.

MR. MORRISON: Well of course in order to do that we would have to be satisfied with the results. That is to say if the results can be obtained in a self contained set of figures that do not relate to any other apportionment that would be quite true.

MR.MORRISON: I feel that this information should be available to Mr. Hamilton, who is familiar with the materials rather than have it given to us with the idea of some other set of accountants going in to do the work. Now if the figures can be obtained by going into the oil department, or the absorption plant, well and good, but I think it will be agreed that that will hardly be possible.

THE CHAIRMAN: What authority have I to go into an aspect of the company's affairs that is not a public utility, and definitely the absorption plant is not. What you suggest is that we go in there and get a break-down, a break-down of the three divisions, of the absorption plant, the gas and oil, get a break-down of the whole field.

MR.MORRISON: Well I am only interested in the gas.

THE CHAIRMAN: And if you are not satisfied with the final figure, then what?

MR.MORRISON: Then you would have to request of them as to where they got their materials, because after all it does touch the integrated company.

THE CHAIRMAN: Suppose that information was obtained by Mr. Hamilton.

MR.MORRISON: That is the suggestion, and made available to all the other interested parties.

THE CHAIRMAN: Has any one any other submission on that?

MR. FENERTY: I agree with what Mr. Morrison says that the practical result of the application is that it probably necessarily involves the consideration of the break-down as between the oil and the gas end of it.

But I submit that if that is so, it cannot be helped, as Royalite has certainly conducted its operations as an integrated company. And I submit further that there should be no objection under the Act as it now stands. The fact is that the oil production comes from oil wells, it comes from oil wells which under the present Act are a public utility. Section 2(h)(v) says:

" Public utility means, any system, well, works, plant,equipment or service for the production of gas, including gas in its ntural state, as and when produced from the earth."

which is capable of producing natural gas as defined in another paragraph. Now every well in Turner Valley comes within that definition, as far as I know. I do not think there is a pumping proposition in the field. There is not any well that does not depend on the gas and there is not any well that is not capable of producing gas.

THE CHAIRMAN: Again on that point, Mr. Fenerty, can I go behind the Act? It may have been information with respect to something that is now a public utility but is with reference to a period of time when it was not a public utility. Surely I can't go behind the Act.

MR. FENERTY: A full Court has to some extent dealt with that situation. But you can, I submit, under the authority of Section 19, you can require the production of any document, no matter what the date,which will assist this Commission, or anybody else, and offer some evidence as to the proper apportionment of both revenue and costs, as between the oil and the gas industry. Surely it is not a matter of when those documents came into existence.

THE CHAIRMAN: Now are you not assuming, Mr. Fenerty, that in these documents of the company prior to the time it became a public utility, are you not assuming that they must have made apportionments as between the three different branches?

MR. FENERTY: Let us say that there are some documents, some other documents which happen to be in the possession or record of some particular company which will give the actual cost of an integrated operation, how much is apportioned to oil, how much to gas, what is the profit of those respective operations, the losses on those respective operations and everything. Is that not the most cogent evidence you can get as to the apportionment between the oil and the gas industry, a pratical demonstration, and does it matter whether it occurred in 1905 or 1945, if it is applicable to the facts as they exist today.

THE CHAIRMAN: That is, up to the extent of my power to order them to produce.

MR. FENERTY: Perhaps that is right. Perhaps you cannot find out as to the condition that existed prior to that time, but I say it is quite material. We have a practical set of figures, not a theory. The proof of the pudding is in the eating, and those figures will enable this Board to find out what the situation is, and it will give an actual demonstration to this Board of what the costs actually are. Now it seems to me that those are worth a thousand theoretical suggestions.

THE CHAIRMAN: Supposing too that there is no such apportionment in the books, and then someone would have to

sit down and make the allocations from the information that is.

MR. FENERTY: I think I know these gentlemen too well not to worry about there not being an apportionment.

MR. STEER: Mr.Chairman, I may say that this thing strikes me, when we come to the question of operating costs and the amounts that are charged against this natural gas business, the Madison Company will be offering certain evidence, and it strikes me that on cross-examination they could be asked as to what the apportionment was that was made of the respective costs in 1942 and 1943. That question can be asked and they will have to get the information, and all that is suggested now, as I understand it, is that that information be made available in advance.

THE CHAIRMAN: I am going to make this suggestion. Up to the present time the Royalite has co-operated with Mr. Hamilton to the fullest possible extent, is that correct?

MR. McDONALD: That is correct, I understand.

THE CHAIRMAN: The information now asked for is for the production of the books to enable Mr. Morrison to prepare his submission, is that right?

MR.MORRISON: That was not the idea, Mr. Chairman. The idea was that it should form part of the material obtained by Mr. Hamilton in the same way that he has obtained the other material. I mean, the other parties are just as entitled to it as the City.

THE CHAIRMAN: Then if not for the purpose of preparing the submissions, it is for the purpose of a critical analysis of whatever evidence might be produced.

MR.MORRISON: And the information as to the cost prior to the institution of the Madison.

THE CHAIRMAN: I am going to ask Mr.Chambers to meet you and Mr. Hamilton and Mr.Fenerty to discuss with you and see if you cannot arrive at something. If you cannot we will have to make an order of one kind or another. The Royalite has co-operated so well in the past I feel sure there will be no difficulty in getting reasonable information from them. Will you do that?

MR. CHAMBERS: I would like to put the position of my client on the record.

THE CHAIRMAN: Oh, I think you have done that, Mr.Chambers.

MR. CHAMBERS: We gave the information to Mr. Hamilton as a representative of the Board, as he was at that time, but he now represents the Government. We are not quarrelling with that.

THE CHAIRMAN: But, Mr. Chambers, you are not suggesting to Mr. Hamilton that there was some of that information that he should not have given to the Board, do you?

MR. CHAMBERS: On this particular question, no. On the operating of the gas before you, no.

THE CHAIRMAN: So that anything you gave to Mr. Hamilton he is entitled to give it to us, and he is also entitled to give it to all the other parties.

MR. CHAMBERS: There was no reservation so far as the operating costs of the gas before you. That is my information, and I still say there might have been some question whether we had to give it or not. However, that

is a different thing. We gave it to him. Now whenever he is prepared to use it we will have an opportunity to examine him fully on it and we will have all the information. When he has that ready to use we have no objection to his distributing it to the others. But if he is not going to use it then my position is that a different consideration arises altogether. I am seeking to rely on my rights.

THE CHAIRMAN: You get together and see what you can do. Actually my own view is that we are trying to reach as closely as possible the truth in this inquiry. There is no need for reservations of any kind. All relevant information should be given. However, I do not want to make an order that I may have no jurisdiction to make. So that I suggest that you get together and see if you can arrange it. If you cannot arrange anything I will have to make a ruling of some kind. Anything further this morning? If not, then we will adjourn to 9.30 tomorrow morning. Please be on time. I am ready to go.

(The hearing was adjourned until 9.30 A.M., Tuesday, March 13th, 1945).

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